

What is Claimed:

1. A method for identifying an miRNA and its target RNA, the method comprising
 - (a) obtaining an miRNA/target RNA complex;
 - 5 (b) optionally crosslinking the complex;
 - (c) transcribing target complementary RNA (tcRNA) from the target RNA;
 - (d) synthesizing cDNA complementary to the tcRNA; and
 - (e) sequencing the cDNA,thereby identifying the miRNA and its target.
- 10 2. The method of claim 1, wherein obtaining the miRNA/target RNA complex comprises
 - (a) obtaining miRNA;
 - (b) administering miRNA to a cell or cell extract; and
 - 15 (c) allowing miRNA/target RNA complexes to form;thereby obtaining an miRNA/target RNA complex.
3. The method of claim 1, further comprising:
 - (a) contacting the miRNA/target RNA complex with a bifunctional biotin-aminopentyl 8-hydroxypsoralen (Compound 1); and
 - 20 (b) photocrosslinking the complex.
4. The method of claim 3, further comprising immobilizing the miRNA/target RNA complex using avidin-coated magnetic beads.
- 25 5. A method for identifying a target RNA of an miRNA, the method comprising
 - (a) obtaining a modified miRNA comprising an amino-modified cytosine or amino-modified uracil;
 - 30 (b) contacting the miRNA with a target RNA;
 - (c) allowing an miRNA/target RNA complex to form;

- (d) labeling the complex with a biotin compound selected from an NHS activated ester of biotin butanoic acid (Compound 2) or photocleavable biotin (Compound 3);
- (e) transcribing target complementary RNA (tcRNA) from the target RNA;
- 5 (f) synthesizing cDNA complementary to the tcRNA; and
- (g) sequencing the cDNA,
- thereby identifying the target RNA.

6. The method of claim 5, further comprising immobilizing the

10 miRNA/target RNA complex using avidin-coated magnetic beads.

7. A method for identifying the target RNA of an miRNA, the method comprising
- (a) obtaining an miRNA having a known sequence;
- 15 (b) contacting the miRNA with a target RNA;
- (c) allowing an miRNA/target RNA complex to form;
- (d) labeling the miRNA/target RNA complex with a compound selected from an activated ester of hexanoic acid linked with a biotin and a 4-thio-uracil (Compound 4) or an activated ester of hexanoic acid linked with a biotin and 8-hydroxy-psoralen (Compound 5);
- 20 (e) optionally crosslinking the miRNA/target RNA complex;
- (f) transcribing target complementary RNA (tcRNA) from the target RNA;
- (g) synthesizing cDNA complementary to the tcRNA; and
- (h) sequencing the cDNA,
- 25 thereby identifying the target RNA.

8. The method of claim 7, further comprising the step of immobilizing the complex on avidin-coated magnetic beads.

9. The method of any one of claims 1-8 wherein the miRNA/target RNA complex forms in a cell-free solution.

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10. The method of any one of claims 1-8 wherein the miRNA/target RNA complex forms in a cell.

11. A method for identifying the target RNA of an miRNA, the method
5 comprising
(a) contacting a biotin-labeled miRNA having a known sequence with a target RNA;
(b) allowing an miRNA/target RNA complex to form;
(c) crosslinking the miRNA/target RNA complex, *e.g.* with a psoralen
10 compound or other crosslinking agent;
(d) immobilizing the complex on avidin-coated beads;
(e) reversing the crosslink;
(f) transcribing a complementary strand from the target RNA using reverse transcriptase and a cDNA primer, *e.g.*, a primer having a sequence
15 corresponding to the miRNA;
(g) synthesizing cDNA complementary to the transcribed strand of (f); and
(h) sequencing the cDNA,
thereby identifying the target RNA.

20 12. The method of claim 11, wherein step (c) comprises crosslinking the miRNA/target RNA complex via a modified nucleotide in the miRNA.

13. The method of claim 12, wherein the nucleotide is a uridine or cytidine within the miRNA.

25 14. The method of claim 13, wherein the modified nucleotide is an amino-modified uridine or amino-modified cytidine within the miRNA.

15. The method of claim 12, wherein the nucleotide is a uridine, thymidine or
30 guanosine within the miRNA.

16. The method of claim 15, wherein the modified nucleotide is a 4-thio uridine, 4-thio thymidine or 6-thio guanosine within the miRNA.

17. The method of claim 12, wherein the crosslink is targeted to the 5' end of
5 the miRNA

18. The method of claim 17, wherein the crosslink comprises an amino-modified 5' nucleotide.

19. The method of claim 18, wherein the crosslink comprises an amino-modified 5' uridine or cytidine.
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20. The method of claim 12, wherein the crosslink is targeted to the 3' end of the miRNA.
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21. The method of claim 20, wherein the crosslink comprises an amino-modified 3' nucleotide.

22. The method of claim 21, wherein the crosslink comprises an amino-modified 3' uridine or cytidine.
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23. The method of claim 11 wherein the miRNA/target RNA complex forms in a cell.

24. The method of claim 11 wherein the miRNA/target RNA complex forms in a cell-free solution.
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25. A method for identifying a target RNA of an miRNA, the method comprising
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- (a) contacting a cell with a psoralen-biotin conjugate such that the conjugate binds to target RNA within the cell;
- (b) allowing the target RNA to form a complex with miRNA within the cell;

- (c) immobilizing the miRNA:target RNA complex on avidin-coated beads;
 - (d) reversing the crosslink;
 - (e) transcribing a complementary strand from the target RNA using reverse transcriptase and a poly A primer;
 - 5 (f) synthesizing cDNA complementary to the transcribed strand of (f); and
 - (g) sequencing the cDNA,
- thereby identifying the target RNA.

26. A method for modulating the expression of a target RNA in a cell, the
- 10 method comprising
- (a) identifying an miRNA that affects the expression of the target RNA using the method of any one of claims 1, 5, 7, 11 or 25; and
 - (b) modulating the activity of the miRNA in the cell
- thereby modulating the expression of the target.

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27. The method of claim 26 wherein the expression of the target RNA is increased or decreased.

28. The method of claim 26 wherein the target RNA encodes a gene involved
- 20 in a proliferative or differentiative disease.